Abstract Submitted for the MAR12 Meeting of The American Physical Society

Superconducting-to-Normal Switching and I-V Experiments showing Multiple Tunneling Channels in a Multi-Gap Superconductor¹ STEVE CARABELLO, JOSEPH LAMBERT, JEROME MLACK, Drexel University, WENQING DAI, YI. SHEN, QI LI, The Pennsylvania State University, DANIEL CUNNANE, C.G. ZHUANG, KE CHEN, X.X. XI, Temple University, ROBERTO RAMOS, Indiana Wesleyan University — Magnesium diboride is a BCS superconductor with many interesting properties, notably its two superconducting energy gaps associated with the disconnected sheets of its Fermi surface. A heterojunction, using the dual-gap MgB_2 and a single-gap superconductor as its superconducting electrodes, provides a system well-suited for exploring the unique properties of MgB_2 , by exhibiting multiple tunneling channels. We present data from superconducting-to-normal state switching experiments and tunneling spectroscopy experiments to temperatures as low as 20mK that indicate multiple tunneling channels in this multiple-gap superconductor. We describe features of escape rates and I-V curves that may be consistent with recent published theoretical work on macroscopic quantum tunneling in multi-gap superconductors.

¹This research has been supported by a grant-in-aid from Sigma Xi.

Steve Carabello Drexel University

Date submitted: 11 Nov 2011

Electronic form version 1.4